

An early historic assemblage offshore of Godawaya, Sri Lanka: Evidence for early regional seafaring in South Asia

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Abstract

Investigations in 2010 by an international team of maritime archaeologists yielded a concentration of artefacts identified by the authors as the remains of a shipwreck off the southern coastal village of Godawaya, Sri Lanka. The major findings from this site include many quern stones, various types of ceramics, and glass ingots. The comparative study of the artefacts from the Godawaya site and terrestrial sites of Sri Lanka and India suggest that the ship might have been originated from the southern part of the Indian subcontinent. Based on analysis of the artefacts and radiocarbon dating of wood fragments from the site, a broad date of 2nd BCE to 2st centuries CE is assigned to the assemblage, assigning it to the early historical period. Thus, this is the earliest known and as yet investigated shipwreck in South Asia.

Keywords: Sri Lanka, quern stones, Black and Red Ware, glass ingots, Early historic shipwreck

1.0 Introduction

The strategic location of Sri Lanka in the northern centre of the Indian Ocean allowed it to develop to a great extent during the medieval period (8th to 14th centuries) as a centre of maritime commercial interfaces between East and West, from East Asia to the Persian Gulf, Arabian Peninsula and African continent (Hourani 1995, Tampoe 1990, Bopearachchi 1996). The island, however, played an important role in earlier and later periods (Ray 2003:117). The over 1,700 km-long coastline of Sri Lanka is characterised by bays, headlands and sandy beaches (Swan 1983:1), and this topography has facilitated sheltered anchorages and beaching zones. The presence of several harbours dating from the early historical period (3rd century BCE to 2nd century CE) to the Colonial period (15th to the mid-20th centuries), and the discovery of numerous Colonial period shipwrecks along the Sri Lankan coast indicate a long and proactive participation of Sri Lanka in Indian Ocean maritime trade (Somasiri 1991).

During the Megalithic period/Iron Age, prior to the 3rd century BCE, material culture – particularly finds of ceramics – suggest close association with southern India (Conningham and Allchin 1995). Traditionally, the island's early history was heralded by merchant settlers from Northern India and the second phase by the introduction of the Buddhism through an envoy of Emperor Ashoka, in the mid-3rd century BCE. The strength of association with Northern India is reflected archaeologically by the discovery on the island of coins, including Indian punch-marked (6th to 3rd centuries BCE), Indo-Greek (3rd to 1st centuries BCE), Indo-Scythian (1st century BCE to 1st century CE), and Kushana types (1st to 3rd centuries CE) (Tomber 2008:145).

Sites such as Anuradhapur (Conningham, 2006), Tissamaharama (Schenk, 2001), and Mantai (Carswell 1990) (Figure 1) provide significant insight into early external trade relations of Sri Lanka (Tomber 2008:147). The inland site of Anuradhapur, the most extensive archaeological site of Sri Lanka, yields remains dating from 800 BCE to 1100 CE (Deraniyagala, 1992 and Conningham 2006). Several finds, such as a fragment of glass from the eastern Mediterranean dating to the 1st century BCE (Conningham, 2006:334) along with a few late Roman coins dating to the 5th century CE, indicate that distant external contacts reached inland during the early centuries of the first millennium CE. During the late historical and early medieval periods at Anuradhapura, Persian Gulf imports are present, as significant amounts of Sasanian and Early Islamic pottery have been found (Conningham and Batt 1999).

Excavations at Tissamaharama, on the southern coast of Sri Lanka, provide interesting foreign material such as Roman amphorae and Islamic glazed wares (Schenk, 2001), indicating importations in this part of the island from the 2nd century BCE to the 14th century CE. At Mantai, archaeological investigations revealed a long cultural sequence commencing in the 2nd century BCE and lasting until the 11th century CE with evidence of external contacts (Carswell and Prickett, 1984:57).

Despite of the presence on land of evidence of active external trade and commerce since the early historic period on the island of Sri Lanka, information regarding early indigenous ships and boats is relatively poor, and shipwreck archaeology in South Asia in general is at a nascent stage. For example, in southern Sri Lanka, maritime archaeological investigations during have yielded four Colonial period shipwrecks in Galle Harbour and at Great Basses Reef (Manders et al. 2004, Muthucumarana, 2007, Parthesius, et al., 2003; Throckmorton, 1964), and a few stone anchors indicate that Galle Harbour was in use since the early medieval period. A cultural assemblage found off Bet Dwarka Island in northwest India, probably of Mediterranean origin, shows the existence of long-distance maritime-based connections in the 1st -2nd centuries CE (Gaur et al., 2006), but no ship parts have been found at the site. Thus the assemblage at Godawaya of pottery, quern stone, glass ingots and wood fragments, identified by the authors as a shipwreck, is the oldest known maritime assemblage found in the region; due to its character, it helps define the history of indigenous seafaring in South Asia (2nd c. BCE to 2nd c. CE).

1.1 Topography and archaeology of the Godawaya coast

The village of Godawaya is situated on the earlier eastern bank of the Walawe Ganga River, one of the major rivers on the southern coast of Sri Lanka (Figure 2). Presently, the mouth of the river is blocked by an extensive dune barrier and the river debouches into the sea at Ambalantota, 3 km west of Godawaya. However, the dune barrier is often opened by floods or an artificial outlet opened to divert flooding during rains. The coast around Godawaya consists of series of wide bays adjacent to well defined headlands. Beaches are broad with often steep gradients and dunes are plentiful (Swan, 1983:134).

Godawaya was known as “Godapavata-patanaha”, mentioned in a *Brahmi* inscription found in Godawaya temple (Falk 2001: 328), dating to the 2nd century CE (Roth et al. 2001: 296), and in Mahavamsa, the etymological identifiable term ‘Gotapabbata’ is used (Geiger 1912: 255). The inscription reads as 1. *Siddham Godapavata patanahi Su(ka) su(ri)yi*, 2. *Raja Gamani Abaya viharata dini*, which translate as ‘Success! The customs duties of the port of

Godapavata, King Gamani Abaya granted to the vihara (temple)' (Paranavithana, 1983). Thus, it indicates that Godawaya was an important port that collected custom duties during the early centuries of the Christian era. The earliest archaeological evidence from Godawaya traces the history of this region from the Mesolithic period/Iron Age. A Mesolithic-period site is situated on the eastern bank of the Walawe Ganga River, on a raised hillock where the river merges with the sea. A few projecting boulders located here might have served as a shelter. Archaeological investigations near the present fishing harbour in the intertidal zone yielded the remains of an earlier port which include four stone pillars (average height 3.30 m) found within an undated context; however, these have been assigned at a date between 1st century BCE and 6th century CE, based on the local archaeological material of Godawaya village (Roth et al. 2001:324). A triangular single-hole stone anchor discovered in 2003 (Muthucumarana 2009), is similar to finds reported along the northwest coast of India, dating broadly from the beginning of the first millennia CE and the late medieval period (Gaur and Vora, 2011).

2.0 Methodology

The Godawaya site was discovered by two fishermen who are also divers: they recovered a quern stone in 33 m of water about 4 km off Godawaya, which they handed over to a German archaeology team who were excavating at Godawaya. Recognising the historical importance of this artefact, they handed it over to Maritime Archaeology Unit (MAU) based in Galle Fort at Galle Harbour. Later the team members of MAU contacted the finders and planned preliminary investigations in 2008. A survey was undertaken for eight days in the month of December 2010 by an international team of maritime archaeologists supported by UNESCO and the Cultural Heritage Agency of the Netherlands (Gaur et al., 2011).

2.1 Field Survey

For underwater investigations of the assemblage, three small fibre-glass boats were hired locally from Godawaya village. The exploration team was comprised of 12 SCUBA divers, with about 50 dives conducted over the course of eight days. Using a rope with metre tape attached, a 50 m baseline was established on a bearing of 300⁰. The baseline was then divided into three sections, each section to be recorded by a dive team. All observed archaeological features and cultural artefacts such as pottery which include a few complete vessel and fragmented sherds, quern stones were plotted and each artefact was described and measured. One team was assigned to do site photo-documentation using two digital cameras and one underwater video camera; they recorded on-site

activities and individual artefacts with scales. Based on these field data, a preliminary site map was plotted.

2.2 Analytical methods

In course of the exploration, an unidentified copper object, two glass ingots and small portion of iron concretion was recovered and later analysed at the National Institute of Oceanography, Goa, India, using Scanning Electron Microscope (SEM; model JSM 5600) and Energy Dispersive Spectrum (EDS; model JOEL 5800 LV) to determine their chemical composition. The copper and glass were selected for SEM-EDS analyses owing to their unaltered surfaces, which were devoid of weathering and also lacked any inclusions of foreign material. Each specimen was mounted and then sputter coated with about 20-nanometre thick gold coating. Each coated specimen image was analysed by SEM with an EDS attachment. A copper sample was examined at nine locations while glass sample was examined at five locations.

A wood sample was radiocarbon dated at the Physical Research Laboratory, Ahmedabad, India. The wood sample was treated with dilute hydrochloric acid repeatedly and washed thoroughly with deionised water. The powdered and dried wood sample was combusted in presence of O₂ to yield CO₂. The CO₂ obtained was converted to benzene for ¹⁴C measurement. The radiocarbon activities were assayed using a low background liquid scintillation counter (Bhushan et al., 1994). The calculated ¹⁴C ages were calibrated using INTCAL09 (Reimer et al. 2009).

3.0 Site Description and Finds

The Godawaya site varies between 31 m and 33 m depth. The underwater topography is comprised of a reef surrounded by a sandy seabed, with a big patch of sand in the middle of the reef. The height of the reef above the seafloor varies between 0.5 m and 2 m. There is no extensive vegetation growth observed at site, however, a pinkish layer of algae growth was noticed on the rocks and artefacts at the site. During this preliminary investigation, the site extent was documented at 40 m E-W and 22 m N-S (Figure 3). However, this measurement is based on exposed surface finds only and extension of the site is likely, as material lies buried in the seabed. (At one place, hand-fanning in the sand yielded a number of potsherds just below 0.1 m of sediment.) Excavation would help reveal the site's limits. A large number of artefacts were observed scattered on the seabed, including a variety of ceramics, quern stones, glass ingots, copper fragments, and wooden fragments, and these exposed remains were the focus of the survey's documentation and are described below.

On the seabed, about 4-5 large vessels, and about dozen plates and hundreds of fragmented sherds of ceramic vessels of various sizes were located. Some of the ceramic fragments include rims, bodies and bases. Some distinguishable shapes are small carinated cooking vessels, plates and big globular storage jars (Figures 4 & 5); the heights and rim diameters of two of the storage jars is 100 cm and 85 cm, and 45 cm and 40 cm, respectively. A majority of these ceramics have a thick layer of encrustation. Six ceramic fragments, four fragmentary and two complete vessels, were recovered earlier from the site have been identified as black and red ware (BRW), which is distributed in the southern India peninsula and Sri Lanka.¹ They compare with the local Tissamaharama typology (Schenk, 2001) (Figure 6):

1. Wide-mouth red ware jar with an out-turned thickened rim. It has a pitted surface and coarse fabric.
2. Intact carinated red ware cooking-vessel with an out-turned rim. It has a rough surface and coarse fabric. It is comparable with ceramics from Tissamaharama Form A1-1 rim type 4, dating to 400-200 BCE.
3. Fragmented BRW plate with a featureless straight sided rim. It has a rough surface and medium fabric. It is comparable with Tissamaharama Form G rim 5a, dating to 400-200 BCE
4. BRW bowl with a featureless straight sided rim and carination at waist. Rough surface and medium fabric. It is comparable with Tissamaharama Form G rim type 5a & 4, dating to 400-300 BCE.
5. Medium-sized red ware jar with a slight out-turned thickened rim. Rough surface and coarse fabric. It is comparable with Tissamaharama Form F1 rim type 5 & 4b, dating to 300-200 BCE.
6. Medium-sized red ware jar with an out-turned beaked rim. Pitted surface and coarse fabric. It is comparable with Tissamaharama Form F rim type 1,2,4b, dating to 400-200 BCE.

The most significant artefacts recovered from the site are the quern stones (Figure 7 & 8) as this artefact type provides a narrower date range than the other artefacts and can therefore help secure a date for this cultural assemblage. The five examples found are bases or querns, and are rectangular in shape with four legs. Five such artefacts of varying sizes were recorded, ranging from 30 to 45 cm long, 15.5 and 30 cm wide, and between 10 and 26 cm high. The raw material used for these querns appears to be basalt. Due to thick encrustation on the querns' surfaces, no symbols or designs were

¹ Pottery retrieved in a preliminary visit to the site in 2008 by first, third and last authors of this paper who are the members of the Maritime Archaeology Unit of Sri Lanka.

observed. However, a quern retrieved earlier by the local divers who discovered the site has symbols carved on its front: *Srivasta*, *Nandipad* and a fish.

Glass ingots have also been found at the site;² about a dozen ingots were observed on the seabed during the earlier investigation, but only two were recovered for analysis (Figure 9). The recovered ingots are blue in colour and bun-shaped, weigh ca. 2-3 kg, and have a diameter of ca. 20 cm. The SEM-EDS results of five locations on the glass ingots are provided in Table 1. Silica oxide (SiO₂) is the major component (62.67%, with a narrow value range of 60.61% minimum and 64.17% maximum). Titanium oxide (TiO₂) is present in three locations with an average value 0.63%.

A small quantity of copper was also found at the site; however, the identification of the object or objects to which these fragments might have belonged is difficult. EDS analysis at nine locations show that major elemental oxides present in abundance are CuO, SO₃ and FeO; the average weights are shown in Table 2. Interestingly, CuO weight values range with 97.00% minimum and 98.59% maximum, while FeO is present in only in four locations with an average weight value of 0.293 %, which indicate that the copper of high purity was produced.

A large area in the northwest part of the site included conjoined wooden remains and unidentified material (Figure 10), lying in the middle of the site. From initial observation the wooden remains appear to be groups of logs. One of the parts measures 4.6 m long, 1.2 m wide, and about 1 m deep, with four visible layers. However, the area is overgrown with marine encrustation and thus makes it difficult to identify any specific features. A single 'log' measures 0.1 x 0.15 x 1.2 m; a second 'log' is square in profile: 3.9 x 3.7 x 1.2 m. The measurement of another 'log' is approximately 0.1 x 0.15 x 2 m. Though at present it is difficult to suggest that this part of the assemblage is the remains of a hull, the dimensions of these 'logs' could be part of a wooden hull structure, generally representing planks and frame. Wood analysis has not been undertaken due to small quantity of sample retrieved from the site.

A wood sample recovered from the site was radiocarbon dated to 1910±100 years while the calibrated age shows 1865±100 yrs BP: i.e., 85±100 CE (Table 3).

4.0 Discussion

The relatively compact concentration of a number of artefacts found exposed on the seabed, distributed in an area 44 x 20 m, suggest that the assemblage at the Godawaya site could represent

² Earlier these have been referred to as glaze ingots (Muthucumarana, 2009:21-26).

the remains of a shipwreck. This is further supported by the dating of each artefact group (discussed below), as their chronologies overlap. In addition, the presence of two conjoined wooden sections suggests that there also may be hull parts present at the site and further argue for its identification as a shipwreck; radiocarbon dating of the wood also corresponds generally with the artefact chronologies. However, it is not possible, based on these wooden remains or the artefacts exposed on the seabed, to estimate the dimensions of the ship. The cultural assemblage, comprised of BRW ceramics, quern stones, and glass ingots, suggest that this vessel might have been originated locally, perhaps from the Indian subcontinent. The artefact groups and their chronologies are discussed here.

4.1 Ceramics

As discussed above, fragments of ceramics were identified during the investigation of the Godawaya site. Four fragmentary and two complete vessels were recovered during earlier dives on the site by non-archaeologists, and they were later identified as black and red ware (BRW). Several complete ceramics were identified on site during the archaeological survey: two huge storage jars, medium sized jars, a carinated cooking vessel. In addition, a number of fragments of jar rims and body fragments of other ceramic types including large jars, a few medium and smaller jars, BRW sherds and a carinated cooking vessel, plate and bowl were identified.

BRW is an important ceramic group associated with several Megalithic Period sites of the Indian subcontinent (Wheeler, 1948:274) and Sri Lanka (De’Silva and Dissanayake, 2008: 197); this ware appeared in the 3rd millennium BCE and continued to exist with some variation until the early centuries of the first millennium CE (Gurumurthy, 1981: 242). However, the BRW type is most usually associated with the Megalithic Culture of southern India (Wheeler, 1959: 62-63), and dates to the beginning of the first millennium BCE to 3rd century CE (Gurumurthy, 1981:245). Similarly, a number of port sites of southern India including Arikamedu (Begley et al., 1996 and 2004), Kaveripattinam (Soundararajan and Raman, 1994:131) and Algankulam (Kasinathan, 1992:18) have yielded BRW dating to the 4th -1st centuries BCE.

Schenk’s (2001) detailed analysis of ceramics found at Tissamaharama, a site ca. 50 km north-east of Godawaya on Sri Lanka, notes that a majority of pottery of identical shapes in BRW is found in deposits dating to 400-200 BCE and virtually none were found in layers dating to the end of the 1st century BCE (Schenk 2001: 134). A detailed analysis of ceramics from the Lower Kirindioya Basin in southern Sri Lanka by Somadeva (2006) dates the identical BRW bowls and plate (Type 1A3 & 1B3) to 350-250 BCE. Whereas on the Indian peninsula, similar shapes in BRW have been reported

from the excavations at Uraiyur (Raman, 1988) in the 2nd century BCE contexts; at Kaveripattinam these shapes are dated to 250 BCE (Soundararajan and Raman, 1994). Similarly, Nagada in central India yielded identical shapes in BRW associated with the Northern Black Polished Ware (NBPW) dated to 500-200 BCE (Banerjee, 1986). Based on the pottery types it may be suggested that the ship might have originated from the Indian subcontinent region only. Pottery of the BRW type might have been used on board for storing solid material like grain and liquid such as water and oil.

4.2 Quern stones

Other important finds from the Godawaya site are the bottom parts of five quern stones. A large number of querns of various types have been reported at different archaeological sites from the Indian subcontinent (Ghosh, 1989:184; Gaur, et al. 2005:39). However, four legged querns, such as those from Godawaya site, appeared in archaeological context during the 4th century BCE in Hastinapur, India (Lal, 1955), and were present at several sites in India and Sri Lanka until the 3rd century CE. Legged querns from Adam, in central India, date to 500-150 BCE and have incised designs like *Swastika*, *Nandipad* and *Mina* (IAR, 1988-89:56) which are similar to that retrieved earlier from the wreck. A few hundred of legged querns, mostly broken, have been discovered at Pauni (IAR 1989-90:58) in Maharashtra, India. Sixteen four legged querns have also been identified at Nasik (Sankalia and Deo, 1955:117), and a majority have a projection on one end so that the ground material falls into a dish below. These ends are either rectangular or rounded and are decorated with a crescent-shaped incised dots over which, is the figure of the Buddhist *Triratna*. In India, at Nagda (Banerjee, 1986: 258) and Kaundinyapura (Dikshit, 1968), legged querns have been found in association with Satavahana Period (2nd century BCE to 1st century CE).

In Sri Lanka, the Yatala monastery (Somadeva, 2006:193) about 40 km east of Godawaya, yielded several four legged quern stones and one has a *Brahmi* inscription dated to the 250-100 BCE. Ramba, another Buddhist site about 25 km west of Godawaya, yielded a quern that is now displayed in the site museum. The quern stones from Godawaya site are very similar to those reported from early historic sites of Ramba and Yatala monasteries. The symbols such as *Srivasta*, *Nandipad* and a fish on the quern stone of Godawaya site suggest Buddhist affiliation and similar examples noted at Adam in Central India in context with 500 – 150 BCE (IAR, 1988-89:56). Therefore, quern stones have a long time bracket between 500 BEC and 200 CE. Surface observation of quern suggests that this is made of basaltic rock which is plenty available in Indian subcontinent (Wadia, 1975:275). Thus the origin of these quern stone may be within this part of geography.

4.3 Glass ingots

Although the first regular production of glass was in Mesopotamia and Egypt around 1500 BCE or slightly earlier (Shortland and Eremin, 2006:581-603), glass ingots are not common finds in the archaeological record and thus their discovery at the Godawaya site is important in itself because it demonstrates the maritime trade of raw glass. The evidence for glass production on the Indian subcontinent region dates to the 2nd millennium BCE (Kanungo et al., 2010) and beads are often common finds of this early period whereas during the early historic period (4th century BCE to 2nd century CE) along with beads, bangles also became an important glass product. Glass ingots from the Godawaya site are soda-lime glass (Jones, 2011:4), comprised of low CaO and K₂O content (table 1). An earlier study of glass manufacturing in ancient India was published by Govind (1970) suggest similar type of composition and appears to be like soda-lime glass. Since not much study on the chemical composition of ancient glass has been made from the region, thus a comparison of these glass ingots cannot be made conclusively. Perhaps composition of glass itself may not help in identifying the origin of glass.

4.4 Wood Samples

A wood sample was radiocarbon dated with a calibrated date of 1865±100 yrs BP (in the range of 15 BCE-185 CE). A second radiocarbon date³ was obtained from a wood sample from the Godawaya site, and ranges in date from the 2nd to the 1st centuries BCE (Bopearachchi et al., 2012).

5.0. Dating

Several of the artefact groups from the Godawaya site provide working chronologies for attempting to date the assemblage. In particular, the ceramics and quern stones provide a broad chronology, while the radiocarbon dating provides a narrower range. The glass ingots, however, cannot be applied due to their broad chronology and lack of comparanda. In the present study, the ceramics from the Godawaya site, specifically the BRW type, are compared with chronologies from terrestrial sites such as those in the Lower Kirindioya Basin and Tissamaharama in Sri Lanka and early historic sites of India such as Alagankulam, Kodumanal and Kaveripattinam. This comparison provides a date range of the 4th century BCE to the 1st century BCE. Similarly, a study of the closest parallels for the quern stones, from Yatala in Sri Lanka, and several early historic sites of central and western

³ A wood sample from this site was dated by Dr. Bopearachchi who organized a short field trip just after the present work involving R. Muthucumarana, W.M. Chandraratne, A.M.A. Dayananda (authors of this article), and no additional information could be obtained except an additional wood sample for radiocarbon date.

India, also suggests a period of the 2th century BCE to the 1st century CE. The lower ends of these time frames compares well with radiocarbon dates of the wooden remains, possibly from the hull of the wrecked vessel, but does not rule out the upper end of the date range obtained from the other radiocarbon-dated wood sample from this study. Whereas the other radiocarbon date from the same assemblage falls in the range of 15 BCE to 185 BCE which is of slightly later. However, based on archaeological evidences and radiocarbon date the archaeological assemblage may be dated between the 2nd century BCE and the 2nd century CE.

6.0 Conclusions

Archaeological remains from terrestrial sites in South Asia reveal active maritime trade, and the southern coast of Sri Lanka witnessed maritime activities during the early historical period with a number of sites located and a few extensively excavated. Such important sites include Tissamaharama (Schenk, 2001) and Godawaya (Roth et al., 2001) (see Figure 1), the latter yielding the remains of the early historic settlement and a harbour in the intertidal zone. Inscriptional evidences clearly indicate that Godawaya was an important port during the early historic period (Falk 2001:328). The present discovery of a compact archaeological assemblage offshore of Godawaya, identified by the authors as a shipwreck, significantly illuminates the limited evidence for maritime trade in the Indian Ocean in the early historic period.

It is not possible to suggest an accurate place of origin for this vessel. However, the archaeological remains from the wreck such as quern stones and BRW ceramics originate in the Indian subcontinent region, particularly southern India and Sri Lanka; hence, it is possible that the origin of the ship may be traced to this region. BRW has been a major characteristic feature of the early historic settlements of southern India and Sri Lanka, which has been found from the wreck site points that people from this region actively participated in overseas trade and commerce. The presence of quern stone indicates that these items may also be part of a trading commodity as well as used as ballast.

Although there are terrestrial sites with evidence of long-distance maritime trade, it is a unique site because it can possibly provide a picture of what local, regional trade looked like between India and Sri Lanka in the early historic periods: that the cargo here at least was local, and provides a picture of what went back and forth between the regions.

The preliminary comparative study of the artefacts from the wreck and the radiocarbon dates provide a possible window between the 2nd century BCE and the 2nd century CE. Hence the wreck at

Godawaya is the oldest find from the South Asian region in respect of the shipwreck archaeology. The artefacts observed in the wreck do not provide the clue on the why it was wrecked here. However we are aware that Indian and Sri Lanka had active cultural and trade contacts since the 3rd century BC. Thus both possibilities exists that ship originated from southern India and heading towards Godawaya port and vice versa. Answers of questions such as origin, date, type of vessel and route of vessel may be hidden within the site which awaits a detailed and long-term investigation. At present the site is fully preserved therefore it is necessary to initiate a long term plan for its protection including detail research involving all stake holders nationally, regionally and internationally. Since the Godawaya offshore site is the only example of direct evidence on maritime activities of the early historic period of south Asian region, a better attention is required by the agencies involved in protection of Underwater Cultural Heritage. The site can also be developed as model underwater cultural heritage site in south Asian region to train underwater archaeologists of Sri Lanka and India.

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Table 1. EDS results of elemental oxides abundance (wt %) of glass ingot.

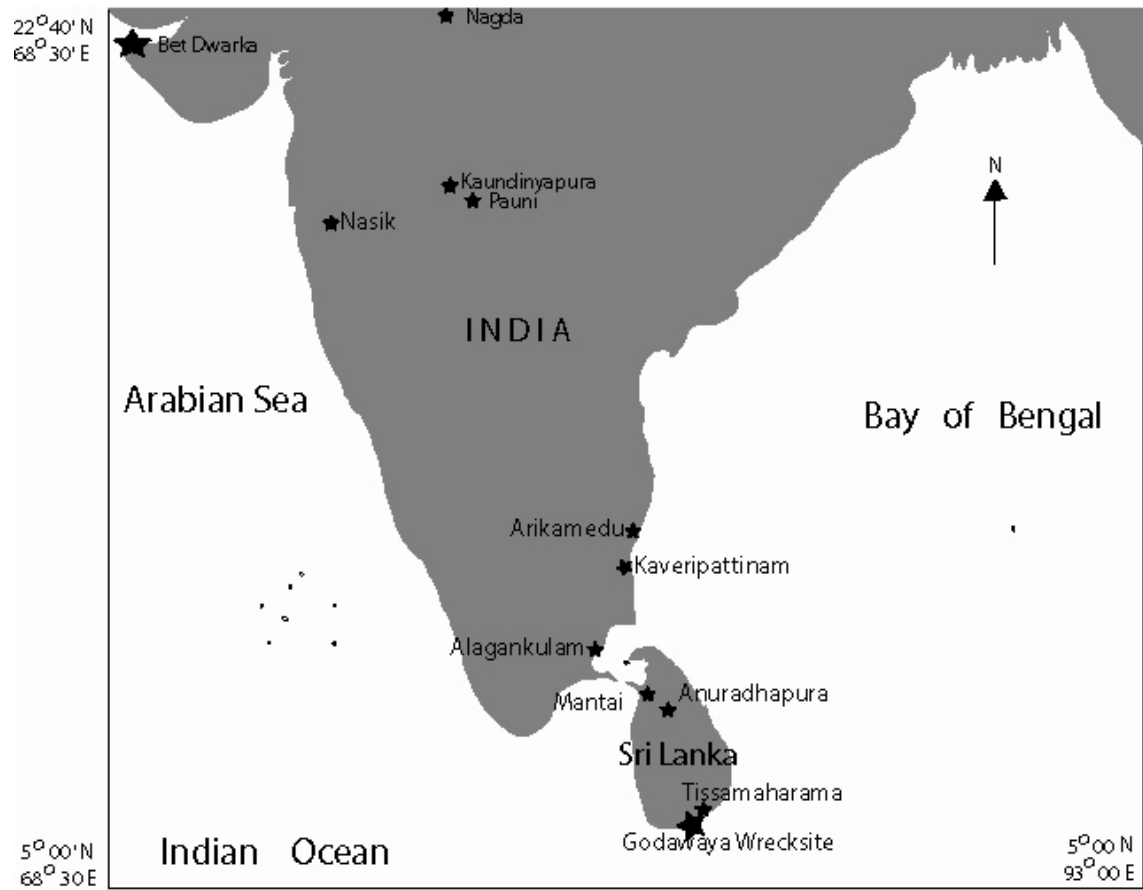
Elemental Oxide	Spot 1	Spot 2	Spot 3	Spot 4	Spot 5	No of spots	Average	Min	Max
Na ₂ O	21.12	21.49	5.17	10.53	5.96	n=5	12.85	5.17	21.49
MgO	0.57	0.92	0.00	0.63	0.00	n=3	0.42	0.00	0.92
Al ₂ O ₃	9.27	9.29	7.08	7.74	7.10	n=5	8.10	7.08	9.29
SiO ₂	60.61	61.21	64.17	63.52	63.82	n=5	62.67	60.61	64.17
K ₂ O	1.23	1.22	2.26	1.87	2.24	n=5	1.76	1.22	2.26
CaO	4.74	4.61	11.91	8.06	11.02	n=5	8.07	4.61	11.91
TiO ₂	0.00	0.00	1.53	0.56	1.06	n=3	0.63	0.00	1.53
FeO	1.34	1.26	5.53	2.64	5.87	n=5	3.33	1.26	5.87
CuO	0.65	0.00	2.35	0.94	2.92	n=4	1.37	0.00	2.92
Ag ₂ O				3.51		n=1			

Table 2. EDS results of elemental oxides abundance (wt %) of copper.

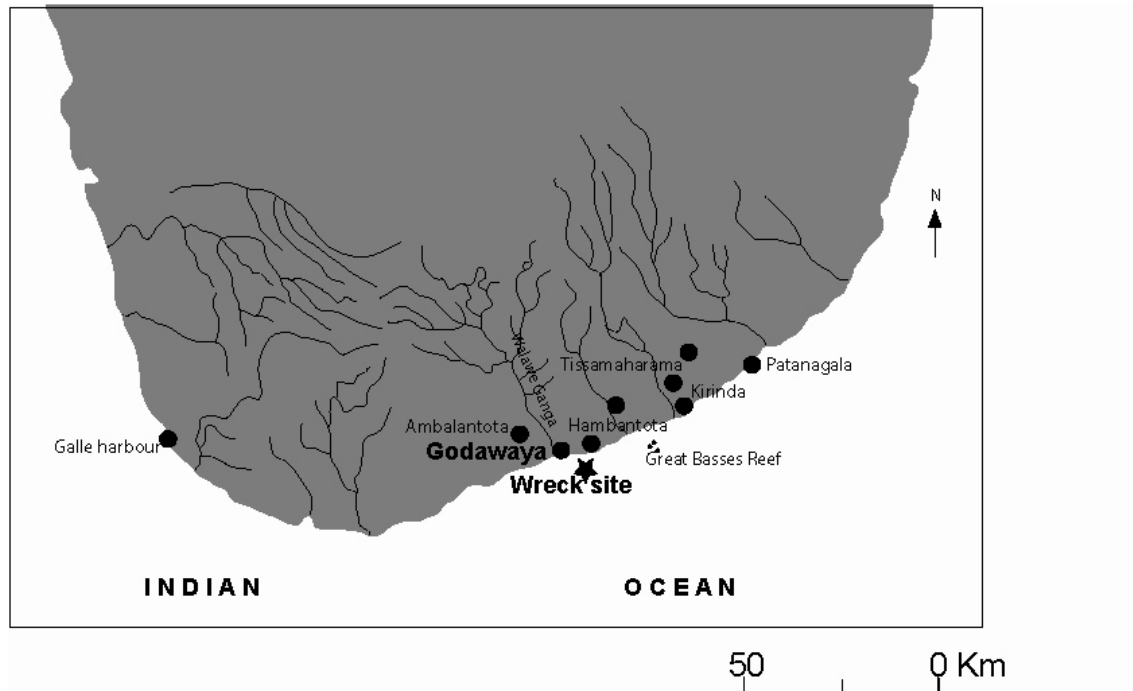
SEM EDS	spot 1	spot 2	spot 3	spot 4	spot 5	spot 6	spot 7	spot 8	spot 9	Av	Min	Max	No. of spots
SO ₃	2.18	1.6	2.15	1.93	2.04	1.59	1.68	3	1.41	1.95	1.41	3	N=9
FeO	0.24	0.27	0	0.36	0	0.3	0	0	0	0.29	0.24	0.36	N=4
CuO	97.58	98.13	97.85	97.71	97.96	98.11	98.32	97	98.59	97.91	97	98.59	N=9

Table 3. Radiocarbon and Calibrated Age of the wood sample from Godawaya, Southern Sri Lanka

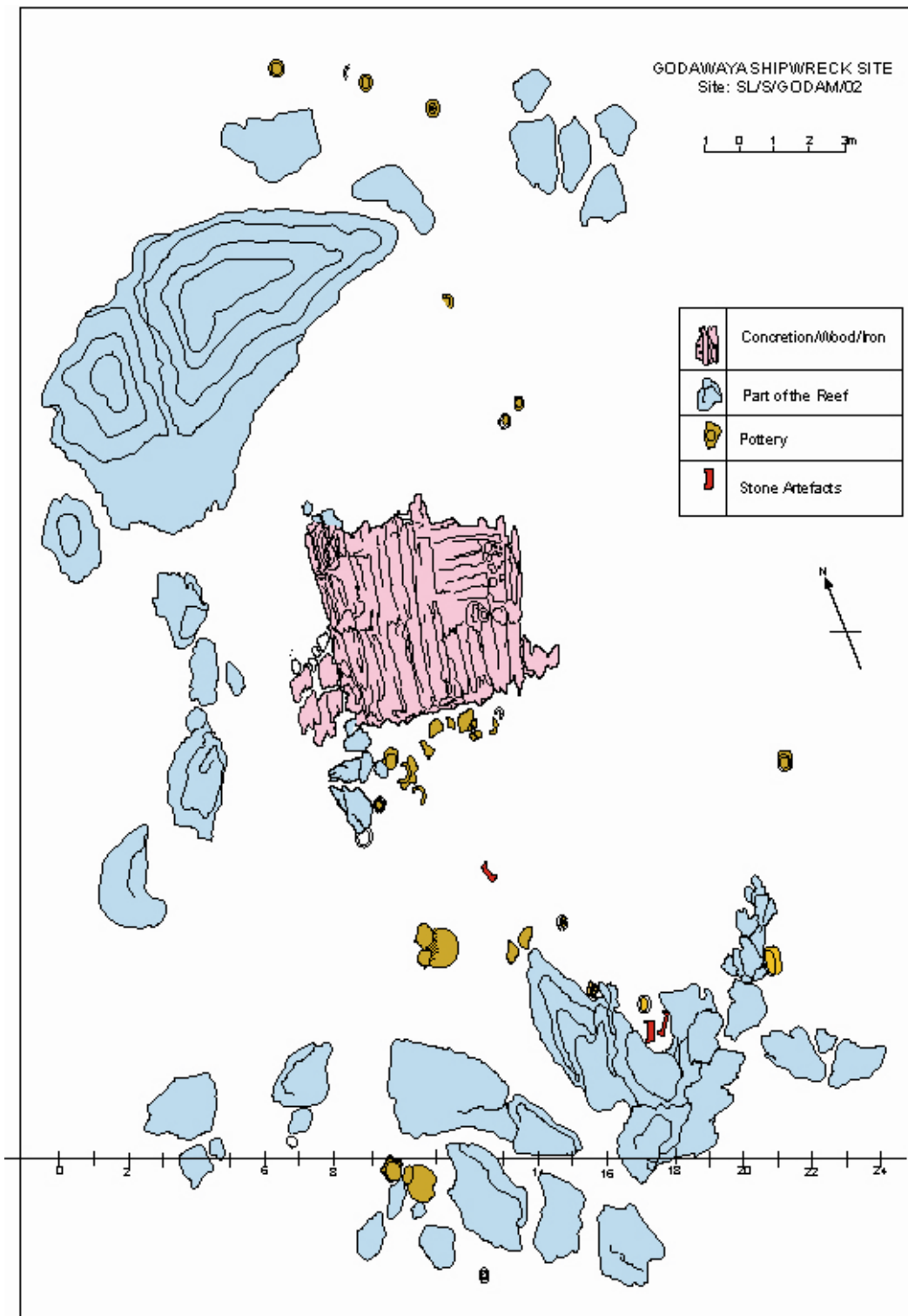
S. No.	Lab Code	Sample Code	Sample	Radiocarbon Age BP (years)	Calibrated Age BP (years)
1.	PRLCH855	SL/S/GODA/M/02	Wood Sample	1910 \pm 100	1865 \pm 100



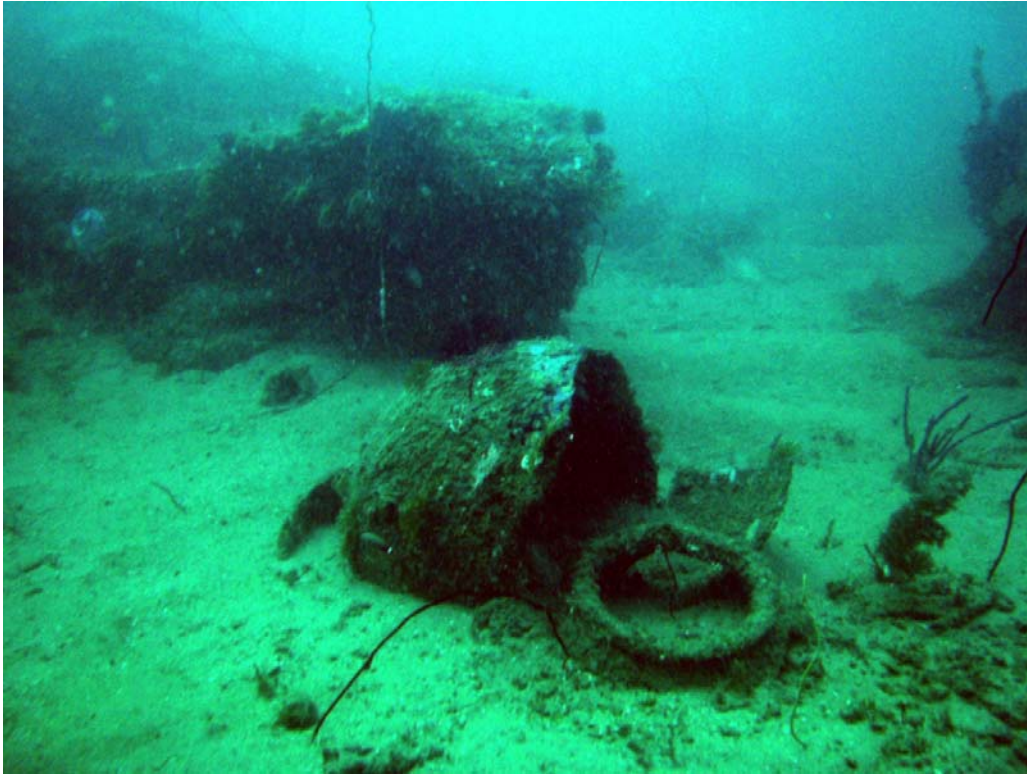
1. Map of India and Sri Lanka with the locations of major archaeological sites (Draw: S.B. Chitari).



2. Map of southern coast of Sri Lanka with location of the site offshore of Godawaya (Draw: S.B. Chitari).



3. Plan of the site off Godawayya (Draw: R. Muthucumarana).



4. A large-sized jar at the site off Godawaya (Photo: R. Muthucumarana) .



1



4



2



5

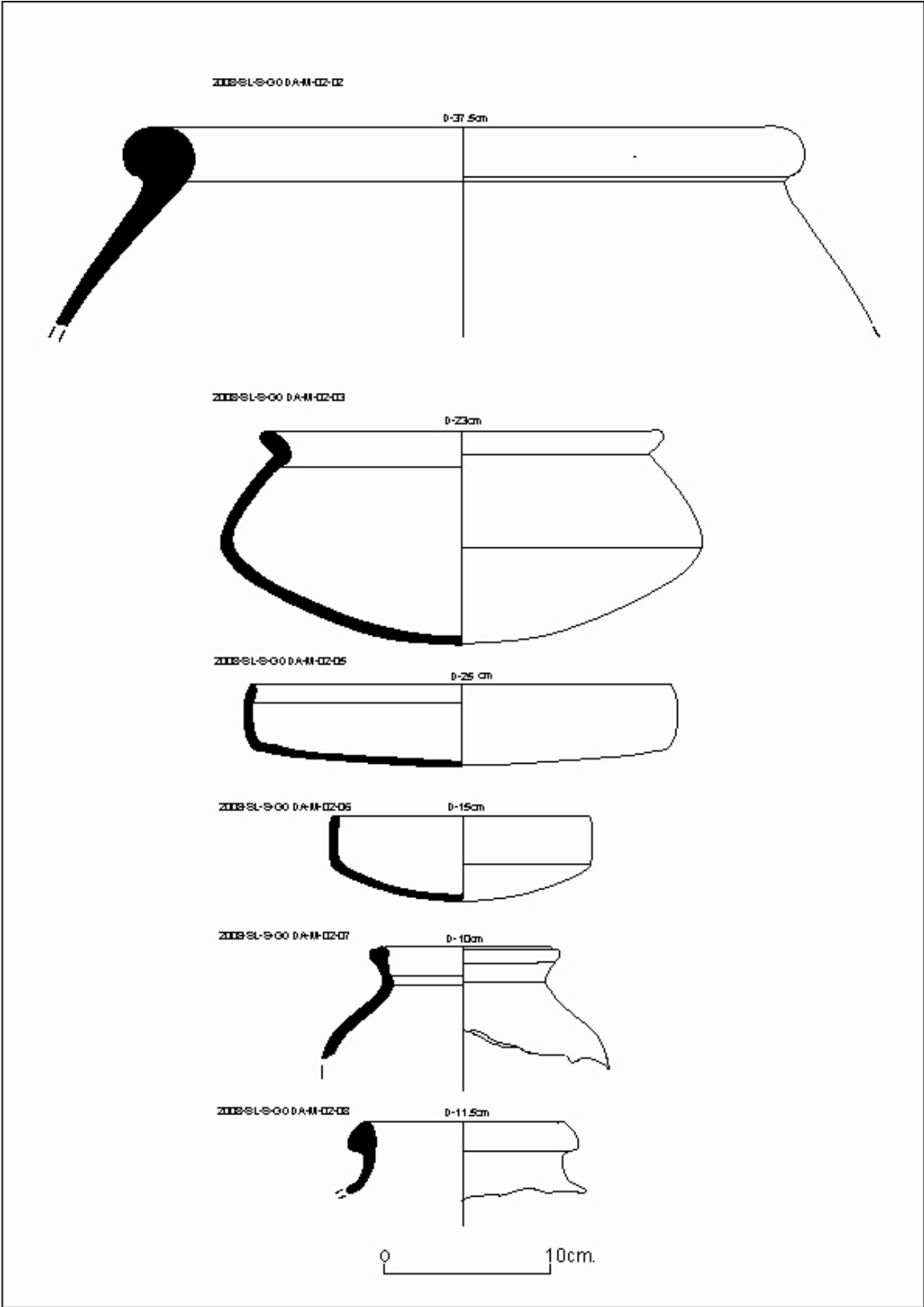


3



6

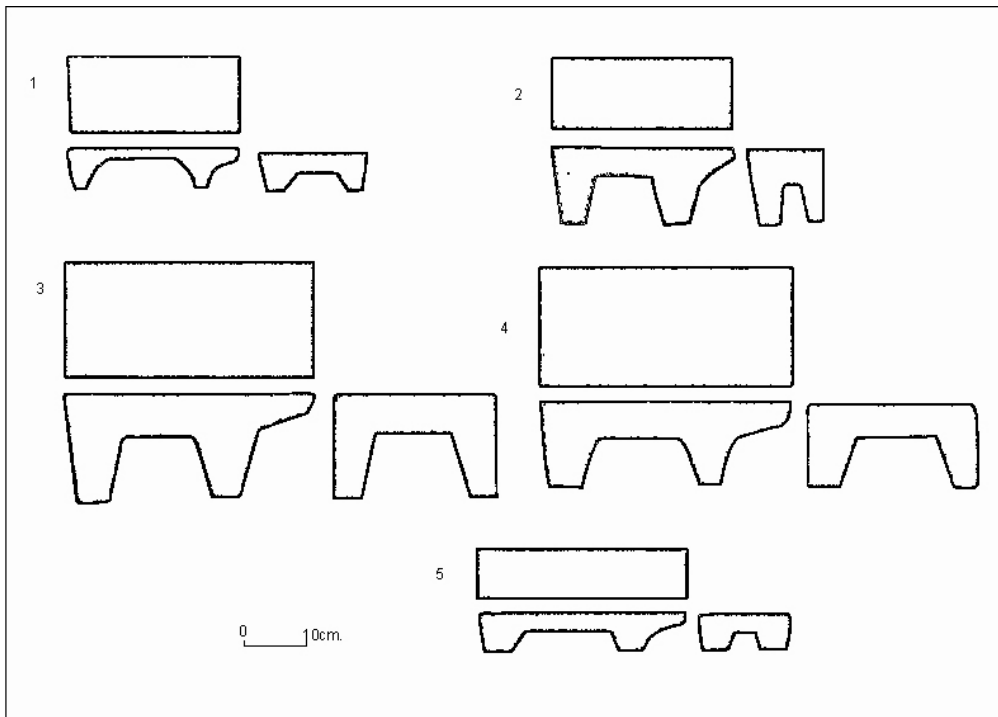
5. Pottery recovered from the Godawaya site (Photo: R. Muthucumarana).



6. Line drawings of pottery from the Godawaya site (Draw: S.B. Chitari).



7. Quern stone documented at the Godawayya site (Photo: R. Muthucumarana).



8. Line drawings of quern stone documented at the Godawayya site (Draw: S.B. Chitari).



9. Glass ingots recovered from the Godawaya site (Photo: R. Muthucumarana).



10. Conjoined wooden remains at the Godawaya site (Photo: R. Muthucumarana).